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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

MAHATAN, CHANNING

ART UNIT PAPER NUMBER

1631

DATE MAILED: 04/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/595,005

Applicant(s)

CAWSE ET AL.

Examiner

Channing S Mahatan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 16-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 16-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

FINALITY WITHDRAWN

Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn. New rejections under 35 U.S.C. § 102 and 35 U.S.C. § 103 are presented below.

CLAIMS UNDER EXAMINATION

Claims herein under examination are claims 1-12 and 16-21. Claims 13-15 and 22-79 have been cancelled.

EXAMINER COMMENTS

For clarification of prosecution history it is noted the first page of the amendment filed 02 March 2004 is directed to the instant application, however, it appears the "Remarks" and "Amendments to the Claims" sections are typographically incorrect and refer to Application No. 09/636,286 (refer to top left of each page within the sections). Additionally, claim 29 (cancelled) appears to contain a typographical error as to its status, wherein "canceled30" and should be replaced with "cancelled".

Further, the Examiner assumes the limitation "to identify a second population of improved catalytic mixture entities" (i.e. claim 1) to broadly encompass any catalytic property improvement the second population catalytic mixture entities have over that of the first population of catalytic mixture entities, wherein an improved catalytic property is evaluated and identified as improved effectiveness as a catalyst or flame retardant or toxicity or rate of production or yield of a set of reaction parameters or any property of interest" (page 10, lines 18-20; the function of Step 26 in Figure 2).

Claims Rejected Under 35 U.S.C. § 112 2nd Paragraph

The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 4-12 are under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Note the rejection of claims 11 and 12 are maintained for reasons of record.

VAGUE AND INDEFINITE

Claim 11 recites the limitation “a third population of entities” which is vague and indefinite. As reiterated from the previous office action Applicants’ definition for the terms “population” and “entity” provides for a “specified set of objects or outcomes to be measured” which are “separate and distinct”. It is therefore unclear what distinguishes the “second population of entities” from the “third population of entities”. If Applicants intend “a third population of entities” to be a further improvement of catalytic mixture entities over that of the “second population mixture entities” the claims are not representative of such improvement. Clarification of the metes and bounds, via clearer claim language, is requested.

Claim 12 recites the phrase “a fit entity” which is vague and indefinite. Applicants did not address this rejection in the response filed 02 March 2004. Applicants are directed to the previous office action, mailed 16 January 2004, indicating the basis for the rejection.

LACK OF ANTECEDENT BASIS

Claims 4-10 recites the limitation “step (B) comprises executing a genetic algorithm with a processor on said binary string to produce a binary string representing said second population of entities” which lacks proper antecedent basis. Claim 1 (which claims 4-10 depend from) does

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not indicate a “binary string” to which the genetic algorithm is to be executed on. For clarification of the interpretation of claims 4-10 the limitation “further comprising generating a binary string representing...” indicates said limitation is an additional step, via the “further comprising” language (i.e. this limitation is performed after step (B) and does not provide further limitations to step (A)). That is, the further comprising follows step (B) because the claim language does not make clear when it occurs.

Claims 4-10 recite the language “said second population of entities” which lacks proper antecedent basis. Claim 1 (which claims 4-10 depend from) does not indicate said “second population of entities”. Rather claim 1 recites “a second population of improved mixture entities”, however, claims 4-10 are not representative of such improved mixture entities.

Claims Rejected Under 35 U.S.C. § 103

The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-12 and 16-21 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Cong et al. taken in view of Brown et al.

Cong et al. reports the development of a systematic and integrated approach for combinatorial chemistry in heterogeneous catalysts through the catalytic oxidation of CO and the reduction of NO by metal alloy catalysts that consist of Rh, Pd, Pt, and Cu (i.e. Group VIII B metal, palladium, inorganic co-catalyst, a combination of inorganic co-catalysts; claims 16-18, 20, and 21). The authors reason that the oxidation of CO by either O₂ or NO is one of the most

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thoroughly studied heterogeneous catalytic reactions and therefore is an ideal system to test and validate the disclosed combinatorial synthesis and screening techniques (page 484, left column, lines 32-36). Three metals were randomly chosen for the construction of the catalyst library, and Rh, Pd, and Pt are provided as an example (page 484, left column, lines 37-39). Cong et al. provides a schematic representation of the experimental apparatus for screening catalytic activity, wherein measurements (i.e. catalytic properties) of product and reactant concentrations of the formed catalytic mixture entities (i.e. Rh-Pt-Cu, Rh-Pd-Cu, and Rh-Pd-Pt libraries) are detected via a CO₂ laser and mass spectrometer or optical detector through capillary transfer line (page 494, left column, lines 17-37; and Figure 1). Cong et al. references WO 98/15969 in Figure 1 for further details of the experimental apparatus used for screening catalytic activity, wherein WO 98 15969 discloses the utilization of a halide in the formation of the combinatorial catalytic library (claim 19; refer to below for further explanation). The authors identify resulting catalyst mixtures that maintain significant oxidation activity (pages 485-486; Figures 2, 3, and 4). However, Cong et al. does not teach the application of a genetic algorithm for the identification of additional optimized (improved) combinatorial mixture libraries (i.e. second population and third population).

Brown et al. describes designing combinatorial library mixtures utilizing a genetic algorithm to optimize the diversity of libraries and discloses the method as being extendable to optimizing distributions of any number of physical or other properties of the library (Title; Abstract; and pages 2305-2308; claim 1). The authors indicate the function of the genetic algorithm is similar to a natural evolutionary process and successive generations of the populations (i.e. first population, second population, third population) will become better adapted

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to their environment (i.e. improved/fit), wherein the properties/parameters of the population are converted into binary strings and subjected to the genetic algorithm having a fitness function which is utilized to evaluate the populations (i.e. weight entities) until fit entities are identified (page 2306, left column, lines 4-12; page 2307-2308, Fitness Function Section; claims 4-12). Brown et al. describes the operations of the crossover, selection, and mutation in the genetic algorithm (i.e. pairing; page 2308, beginning on the right column, line 66 to the left column, line 8; claims 2 and 4-10). However, Brown et al. does not describe utilizing a combinatorial organic synthesis catalyst system comprising a Group VIIIIB metal (i.e. palladium), palladium, halide (i.e. chlorine), inorganic co-catalyst (i.e. Group VIIIIB metal, halide), or a combination of inorganic co-catalysts (i.e. Group VIIIIB metal, halide).

While it is acknowledged Cong et al. does not explicitly state the use of a halide in forming the catalytic mixture entities Cong et al. does reference WO 98/15969, which details the experimental apparatus used for screening catalytic activity. As evidenced by WO 98/15969 a halide (i.e. Cl) is utilized in the construction of the combinatorial catalyst library (page 36-43).

Thus, it would have been obvious to someone of ordinary skill in the art at the time of the invention to practice the high-throughput synthesis and screening of combinatorial heterogeneous catalyst libraries as taught by Cong et al. with the method of designing combinatorial mixture library by a genetic algorithm in view of Brown et al. further in view of WO 98/15969. Cong et al. discloses "heterogenous catalysts is one class of solid-state inorganic materials that is an obvious and attractive area for combinatorial exploration" (page 484, left column, lines 4-6) and "combinatorial synthetic techniques offer the means to synthesize rapidly a large number of chemically distinct entities" (page 484, left column, lines 10-12). Brown et al.

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indicates the successful application of genetic algorithms to a wide range of problems in both chemical and non-chemical domains (page 2305, lines 25-27) and discloses the desirability for compounds within a combinatorial mixture library to be as diverse as possible thereby fully exploring the scope of activity of against the target (page 2304, left column, lines 1-4).

Claims 1-12, and 16-21 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Nan et al. taken in view of Brown et al.

Nan et al. describes the development of a combinatorial library synthesis method (“combinatorial organic synthesis”) for a variety of heterocycles and carbocycles by the palladium-catalyzed carbo- and heteroannulation of 1,2-dienes, 1,3-dienes, 1,4-dienes, and vinylic cyclopropanes or cyclobutanes by aromatic halides bearing functional groups in the *ortho* position (page 297, left column and right columns, lines 3-5 and 4-9, respectively; claims 1 and 16-21). The authors detail the palladium-catalytic cycle (page 298, right column, lines 6-24; and Figure 2). Nan et al. perform the systematic study to identify the appropriate base (B-), catalyst ($\text{XPd}^{\text{II}}(\text{CO})\text{OR}$), and oxidative agent (XY; i.e. CuCl_2 , halide) (i.e. catalytic property; page 298, right column, lines 25-34; claim 3, wherein the wild cards B-, X, Y, and R are indicative of random identification prior to formation). However, Nan et al. does not teach the application of a genetic algorithm for the identification additional optimized (improved) combinatorial mixture libraries (i.e. second population, third population).

Brown et al. is applied herein as cited above. However, Brown et al. does not describe utilizing a combinatorial organic synthesis catalyst system comprising a Group VIIIIB metal (i.e. palladium), palladium, halide (i.e. chlorine), inorganic co-catalyst (i.e. Group VIIIIB metal, halide), or a combination of inorganic co-catalysts (i.e. Group VIIIIB metal, halide).

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Thus, it would have been obvious to someone of ordinary skill in the art at the time of the invention to practice the combinatorial organic synthesis catalyst system (i.e. Group VIIIB metal, palladium, etc.) as taught by Nan et al. with the method of designing combinatorial mixture library by a genetic algorithm in view of Brown et al., wherein Brown et al. indicates the successful application of genetic algorithms to a wide range of problems in both chemical and non-chemical domains (page 2305, lines 25-27) and further discloses the desirability for compounds within a combinatorial mixture library to be as diverse as possible thereby fully exploring the scope of activity of against the target (page 2304, left column, lines 1-4).

No Claims Are Allowed.

EXAMINER INFORMATION

Papers related to this application may be submitted to Technical Center 1600 by facsimile transmission. Papers should be faxed to Technical Center 1600 via the PTO Fax Center located in Crystal Mall 1. The faxing of such papers must conform with the notices published in the Official Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61 (November 16, 1993), and 1157 OG 94 (December 28, 1993) (See 37 C.F.R. § 1.6(d)). The CM1 Fax Center number is either (703) 872-9306.

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Channing S. Mahatan whose telephone number is (571) 272-0717. The Examiner can normally be reached on M-F (8:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael P. Woodward, Ph.D., can be reached on (571) 272-0722.

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Any inquiry of a general nature or relating to the status of this application should be directed to Legal Instruments Examiner, Tina M. Plunkett, whose telephone number is (571) 272-0549 or to the Technical Center receptionist whose telephone number is (703) 308-0196.

Date:

April 12, 2004

Examiner Initials:

CSM

Marianne P. Allen
MARIANNE P. ALLEN
PRIMARY EXAMINER

4/14/04

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